UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,702	02/10/2004	Mathias Pauli	4114-12	8590

23117   7590   03/20/2007

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER
TRAN, KHANH C

ART UNIT	PAPER NUMBER
2611	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/20/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>10 February 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-18</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-5,7,9,10,12-15,17 and 18</u> is/are rejected.

7)☒ Claim(s) <u>6,8,11 and 16</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>10 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some *   c)☐ None of:

       1.☒ Certified copies of the priority documents have been received.

       2.☐ Certified copies of the priority documents have been received in Application No. _____.

       3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1. The Preliminary Amendment filed on 02/10/2004 has been entered. Claims 1-18 are pending in this Office action.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 12-13 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 12, the claimed subject matter "a computer program product" lacks of written description in the original disclosure; see paragraph [0020]. The original disclosure supports only statutory method of claim 1, however, with a brief mention such method can be implemented both as a computer program product comprising program code portions for performing the method and as a hardware solution. The original disclosure lacks of written description of the claimed computer program product.

Regarding claim 13, the original disclosure does not disclose what are included in the claimed subject matter "computer recording medium".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2, 4-5, 7, 9-10, 12-15 and 17-18 are rejected under 35 U.S.C. 103(a)

as being unpatentable over McFarland et al. U.S. Patent 7,027,530 B2 in view of

Matheus et al. U.S. Patent 7,009,932 B2.

Regarding claim 1, McFarland et al. teaches in FIG. 3 a receiver including a

symbol timing circuit 322, a DFT 352, an FFT 324, an amplitude tracking 354, channel

estimation & pilot phase tracking 326; see column 7 lines 10-25.

In operation, the symbol timing circuit 322 keeps track of the time that has

elapsed since the beginning of the signal 100 in order to determine when to trigger the

DFT circuit 352 and the FFT circuit 324 to input the SIGNAL symbol; see column 7 lines

15-45.

Further in column 7 lines 50-67, see also FIG. 3, McFarland et al. teaches timing

is maintained by *adjusting a phase slope in frequency* (same as a delay in time) within a

given range. The six DFT outputs of the DFT 352 are then input to the channel

correction circuit 356, which performs channel correction on the six DFT outputs, based

upon the channel estimation obtained from the channel estimator within the channel

estimation and pilot phase tracking circuit 326. In light of the foregoing teachings,

channel estimation & pilot phase tracking 326 determines and adjust phase slope in frequency. With the correct timing, the phase offset would be removed before channel estimation and correction. The channel estimation is performed after the phase slope adjustment. Determining the phase slope in frequency corresponds to the claimed "*determining the phase ramp*".

McFarland et al. teaches the receiver performing channel estimation, however, does not teach estimating the channel coefficients as claimed in the application claim.

Matheus et al. teaches in another US Patent a frequency tracking unit including a feedback correction unit CORR1, the feed forward correction unit CORR2 as well as the selector SEL and the evaluator EVAL. Based on the channel estimation coefficients, an optimum selection and correction process can be carried out; see column 17 lines 40-55, also FIG. 8.

McFarland et al. and Matheus et al. teachings apply to multicarrier system. As shown in FIG. 3, McFarland et al. teachings further select only carriers of interest for channel correction (box 356 of FIG 3). As recited above, because based on the channel estimation coefficients, an adaptive adjustment of the number of subcarriers can be carried out as taught by Matheus et al., one of ordinary skill in the art at the time the invention was made would have motivated to modify McFarland et al. teachings to further estimate the channel coefficients.

Regarding claim 2, as shown in FIG. 3, McFarland et al. teaches the phase slope in frequency is estimated by the channel estimation & pilot phase tracking circuit 326.

Regarding claim 4, symbol timing is performed in block 322 for minimizing intersymbol interference as common knowledge of one of ordinary skill in the art.

Regarding claim 5, as shown in FIG. 3, the channel estimation & pilot phase tracking is performed after the FFT circuit 324 respectively.

Regarding claim 7, referring to FIG. 3, after FFT circuit 324, the received signal is split into two signals, in which one of the two signals is fed into the channel estimation and pilot phase tracking 326 for determining and adjusting the phase slope; the other signal is fed through channel correction 328, de-map & de-interleave 330 and FEC decoder. The channel correction 328, de-map & de-interleave 330 and FEC decoder 332form a demodulation portion as appreciated by one of ordinary skill in the art.

Regarding claim 9, as recited in claim 1 rejection, channel estimation & pilot phase tracking 326 determines and adjust phase slope in frequency and then performs channel estimation. In view of that, the phase slope adjustment is introduced into the channel estimation.

Regarding claim 10, referring to FIG. 3, channel correction 328 corrects the received data using channel estimation in block 326. Output of channel correction 328 is passed through de-map & de-interleave 330 and FEC decoder 332 for demodulating the received signal.

Regarding claims 12-13, McFarland et al. does not teach a computer program product as set forth in the application claim.

However, McFarland et al. teaches the initial gain is determined based upon training symbols. For training purposes, one of ordinary skill in the art at the time the invention was made would have been motivated to automate McFarland et al. teachings by implementing as program codes stored on a computer readable recording medium to be executed by a computer.

Regarding claim 14, claim is rejected on the same ground as for claim 1 because of similar scope.

Regarding claim 15, claim is rejected on the same ground as for claim 7 because of similar scope.

Regarding claim 17, claim is rejected on the same ground as for claim 9 because of similar scope.

Regarding claim 18, McFarland et al. only discloses the apparatus is a receiver. Nevertheless, in column 1 lines 10-20, McFarland et al. discusses transceivers are electronic devices that include receivers that receive incoming signals and transmitters that transmit outgoing signals, and are very well known. Because of the foregoing disclosure, one of ordinary skill in the art at the time the invention was made would have

been motivated to modify McFarland et al. receiver to incorporate the teachings into a

transceiver.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over

McFarland et al. U.S. Patent 7,027,530 B2 and Matheus et al. U.S. Patent 7,009,932 B2

as applied to claim 2 above, and further in view of Heinomen et al. U.S. Patent

6,389,087 B1.

Regarding claim 3, McFarland et al. does not teach the estimation performed by

linear regression as claimed in the application claim.

Heinomen et al. teaches a graphical representation of relationship between the

pilot frequency and the pilot phase as shown in FIG. 4. In column 6 lines 20-30, the plot

of FIG. 4 represents a frequency offset between transmitter 102 and receiver 106 (see

FIG. 1). The slope of the line 402 corresponds to the timing error 306. As further

disclosed in column 5 lines 5-15, since the pilot phase dependence on pilot frequency is

linear, the linear relationship may be calculated from measured data using well-known

curve fitting techniques and linear regression algorithms.

Because McFarland et al. teaches timing is maintained by adjusting a phase

slope in frequency as recited in claim 1 rejection and because of the linear relationship

between the pilot phase and pilot frequency, one of ordinary skill in the art at the time

the invention was made would have motivated to modify McFarland et al. teachings to

implement the linear regression algorithm for estimating the phase slope of the pilot.

Allowable Subject Matter

5. Claims 6, 8, 11 and 16 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Piirainen U.S. Patent 7,031,419 B2 discloses "Data Transmission Method And System".

Dent U.S. Patent 5,539,730 discloses "TDMA/FDMA/CDMA Hybrid Radio Access Method".

Bevan et al. U.S. Patent 6,891,897 discloses "Space-Time Coding And Channel Estimation Scheme, Arrangement And Method".
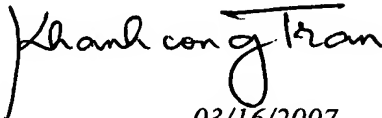
Da Torre et al. U.S. Patent 6,983,127 B1 discloses "Statistical Calibration Of Wireless Base Stations".

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khanh Tran whose telephone number is 571-272-3007. The examiner can normally be reached on Monday - Friday from 08:00 AM - 05:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KCT

03/16/2007
Khanh Tran
Primary Examiner, AU 2611